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Long term outcomes of mesh versus non-mesh repair in inguinal hernia surgery: a systematic review of randomized case controlled study

Resultados a largo plazo de la reparación con malla versus sin malla en la cirugía de hernia inguinal: una revisión sistemática de un estudio aleatorizado de casos y controles

Héctor Josué Ruano Imbaquingo
https://orcid.org/0009-0005-1599-8859
josueruano29@hotmail.com
Pontificia Universidad Católica, Ecuador

Tania Isabel Chacón Muñoz
Universidad Católica de Cuenca, Ecuador
https://orcid.org/009-0004-1242-0691

Erika Priscila Galarza Guaicha
Instituto Universitario San Isidro, Ecuador
https://orcid.org/0009-0006-4528-9145

Ana Paula García Quinde
Ministerio de Salud Pública, Ecuador
https://orcid.org/0009-0009-3637-4323

María Fernanda Berrezueta Herrera
Independent Investigator, Ecuador
https://orcid.org/0009-0000-4939-4782

ABSTRACT

Sexually transmitted infections (STIs) have detrimental effects on overall health and can cause infertility in males and females. Untreated infections like gonorrhea or chlamydia may lead to pelvic inflammatory disease (PID), causing damage and obstruction of the fallopian tubes. Human papillomavirus (HPV) infections, particularly high-risk strains, may progress to cervical cancer, requiring invasive treatments and may cause fertility loss. Herpes simplex virus (HSV) outbreaks can disrupt sexual contact, affecting conception attempts. Syphilis, is another sexually transmitted disease, if left untreated, can lead to epididymitis and erectile dysfunction in males, indirectly influencing fertility. Early detection and treatment of these STIs are crucial to protect infertility in males and females.

Keywords: Sexually transmitted disease. Infertility. STIs. Syphilis. HPV. HIV. AIDs. Gonorrhea. Chlamydia. Diagnosis. treatment strategies. Vaccines.

RESUMEN

Las infecciones de transmisión sexual (ITS) tienen efectos perjudiciales sobre la salud general y pueden causar infertilidad en hombres y mujeres. Las infecciones no tratadas, como la gonorrea o la clamidia, pueden provocar una enfermedad inflamatoria pélvica (EIP), que causa daño y obstrucción de las trompas de Falopio. Las infecciones por el virus del papiloma humano (VPH), en particular las cepas de alto riesgo, pueden progresar hasta convertirse en cáncer de cuello uterino, lo que requiere tratamientos invasivos y puede causar pérdida de fertilidad. Los brotes del virus del herpes simple (VHS) pueden interrumpir el contacto sexual y afectar los intentos de concepción. La sífilis, es otra enfermedad de transmisión sexual que, si no se trata, puede provocar epididimitis y disfunción eréctil en los hombres, influyendo indirectamente en la fertilidad. La detección y el tratamiento tempranos de estas ITS son cruciales para proteger la infertilidad en hombres y mujeres.

Palabras clave: Enfermedad de transmisión sexual. Esterilidad. ITS. Sífilis. VPH. VIH. SIDA. Gonorrea. Clamidia. Diagnóstico. estrategias de tratamiento. Vacunas.

INTRODUCTION

Sexually transmitted diseases (STDs) are caused by microorganisms that are transmitted via sexual contact through the exchange of body fluids such as bloodstream, semen, or secretions in the female genitalia or during oral, anal, or vaginal practices. HIV transmission can also take place through the use of contaminated needles, transfusion of blood and other blood products, and breast milk from the mother to the child during delivery. The signs of herpes include sores in the genital

area, difficulty urinating or engaging in sexual activity, discharge or itching, pain in the abdomen, fever, and swollen glands. Despite STIs' capacity to cause no signs or symptoms, they present many health risks that aggravate the HIV/AIDS epidemic by raising susceptibility to infection and the severity of its manifestations. Women and infants are more affected since STIs can result in pelvic inflammatory disease, infertility, ectopic pregnancy, cervical cancer, and congenital infections. Some of the most frequently transmitted STIs include Human Papillomavirus {HPV}, Human Immunodeficiency Virus {HIV}, Herpes Simplex Virus {HSV}, Chlamydia trachomatis, Neisseria gonorrhoeae, and Treponema pallidum {syphilis}. Persistent or untreated STIs have the potential to cause long-term adverse health impacts. They are also known as sexually transmissible infections or sexually transmitted infections (STIs) (Definition of Sexually Transmitted Infection - NCI Dictionary of Cancer Terms, n.d)

Sexually transmitted infections (STIs) pose a significant threat to global health, especially among individuals aged 15 to 49. As estimated by WHO, each day, more than 1 million curable STIs are contracted worldwide in this age bracket, with most cases showing no symptoms. In 2020, approximately 374 million new infections of chlamydia, gonorrhea, syphilis, and trichomoniasis were reported. Syphilis, in particular, remains a major concern, with an estimated 8 million adults infected in 2022. Among pregnant women, 1.1 million were diagnosed with syphilis in 2022, resulting in over 390,000 adverse birth outcomes. Genital herpes affects over 500 million individuals aged 15 to 49. Human papillomavirus (HPV) infection is particularly concerning, associated with more than 311,000 deaths from cervical cancer annually. STIs profoundly impact sexual and reproductive health, leading to stigmatization, infertility, cancers, pregnancy complications, and an increased risk of HIV transmission. Moreover, the emergence of drug-resistant strains presents a significant challenge, hindering efforts to curb the global STI crisis. These statistics underscore the critical need for effective prevention, diagnosis, and treatment strategies to address this pressing public health issue (WHO, 2024).

Infertility is defined as the inability to conceive after 12 months of regular, unprotected intercourse. Cross-sectional survey worldwide reveals that 9% of women in the childbearing age group experience infertility, and in the United States, only 1. About 5 million females are suffering from this problem. In developing regions, this problem is even higher, and it can reach up to 30% of the total rates. Unattended STIs such as Chlamydia and Gonorrhea, among others, are known to rank among the leading causes of female infertility. In their study, Tsevat et al. (2017) discoursed that since tubal factor infertility was common in most of the study participants, the likelihood of harm and inflammation or scarring due to the infections was high. From this analysis, one can deduce why effective screening and treatment should be encouraged to eliminate STIs and enhance the reproductive health of women (Tsevat et al., 2017).

Objectives: To assess different types of STIs and its adverse effects on infertility among males and female. Evaluate what are different diagnosis options available and how these infections can be treated and prevented.

METHODOLOGY

We decided to run our systematic search using 3 databases: PubMed and Google Scholar and Embase to explore the association between sexually transmitted infections (STIs) and female infertility and how STIs leads infertility, what are risk factors and how STIs can be diagnosed and treated. We used search terms such as Sexually Transmitted Infections OR STIs AND Infertility, and we combined this primer keyword with secondary keywords such as Neisseria gonorrhoeae, Trichomonas vaginalis, Chlamydia trachomatis, and Mycoplasma genitalium.

In PubMed and Google Scholar, we refined our search to exclude MeSH headings unrelated to female infertility and at least one of the four target organisms "female infertility" and "uterine tube occlusion," combined with each infection term. We filtered the results to include only articles published in English from 2013 to 2024. Additionally, we identified relevant articles from bibliographies and medical experts' recommendations.

The combined strings were:

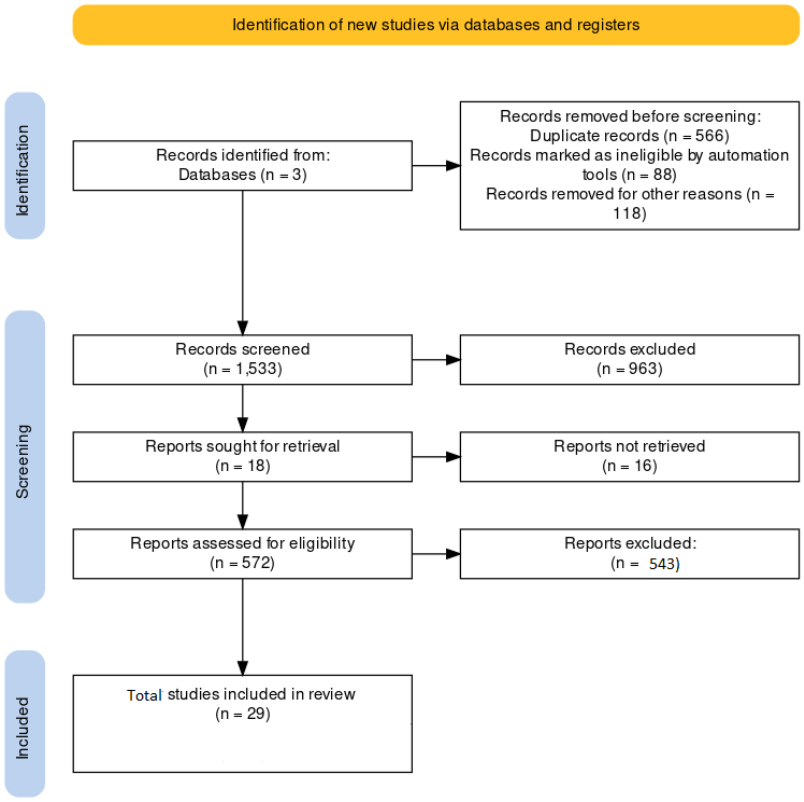
("Female Infertility" OR "Infertility, Female") AND ("Sexually Transmitted Diseases" OR "Sexually Transmitted Infections" OR "Venereal Diseases") AND ("Neisseria gonorrhoeae" OR "Gonorrhea" OR "Chlamydia trachomatis" OR "Chlamydia Infections" OR "Trichomonas vaginalis" OR "Trichomoniasis" OR "Mycoplasma genitalium")

("Female Infertility" OR "Infertility in Women") AND ("STI" OR "STD" OR "Sexually Transmitted Disease" OR "Sexually Transmitted Infections" OR "Venereal Diseases") AND ("Side Effects" OR "Risk Factors" OR "Complications") AND ("Diagnosis" OR "Treatment")

We excluded studies with few participants, no comparison group, or those that were merely case reports. Studies lacking sufficient data to determine the association between STIs and female infertility or reproductive health issues were also excluded.

RESULTS AND DISCUSSION

Figure 1. Identification of new studies via databases and registers



Source: the authors.

A comprehensive search across three databases yielded numerous records. After removing duplicates and irrelevant studies through automation tools and screening, full texts were retrieved for 572 and these reports underwent a rigorous eligibility assessment, resulting in the exclusion of 543 reports. This meticulous process culminated in the inclusion of 29 studies in the final review.

Table 1. Common Sexually Transmitted Infections (STIs)

STI	Cause	Transmission	Symptoms	Treatment	Complications	Prevention
Chlamydia	Bacterium: Chlamydia trachomatis	Vaginal, oral, or anal sex with an infected partner	Fever, abdominal pain, unusual discharge from penis or vagina	Antibiotics	Pelvic inflammatory disease, ectopic pregnancy, infertility, transmission to fetus	Prompt treatment, treating recent sexual partners simultaneously, abstaining from sex after treatment completion
Gonorrhea	Bacterium: Neisseria gonorrhoeae	Sexual contact	Discharge from vagina or penis, painful urination	Antibiotics	Pelvic inflammatory disease, infertility, transmission to fetus, can facilitate HIV transmission	Prompt treatment, treating recent sexual partners simultaneously, condom use
Genital Herpes	Virus: Herpes simplex (HSV-1, HSV-2)	Oral-genital or genital-genital contact	Fever blisters, cold sores (HSV-1), painful blisters around genitals or anus	Antiviral medications	Transmission to sex partners, neonatal herpes	Daily medication, cesarean section if outbreak during labor, notifying partners, avoiding sexual contact during outbreaks
HIV/AIDS	Virus: Human immunodeficiency virus (HIV)	Unprotected sex, sharing needles, pregnancy, childbirth, breastfeeding	Weakened immune system, susceptibility to infections	Antiretroviral therapy	Opportunistic infections, certain cancers	Safe sex practices, condom use, PrEP, early initiation of antiretroviral therapy, avoiding needle sharing, HIV testing and treatment
Human Papillomavirus (HPV)	Virus: Human papillomavirus (HPV)	Sexual contact	Genital warts, cervical, vulvar, penile, anal, oral cancers	Vaccines, medication for warts	Cervical cancer, genital warts, other cancers	Vaccination, regular Pap smear testing, safe sex practices
Syphilis	Bacterium: Treponema pallidum	Sexual contact, from mother to fetus	Painless genital sore (chancre)	Antibiotics	Secondary and tertiary syphilis	Prompt treatment, avoiding sexual contact until sores healed, notifying partners, prenatal screening and treatment, safe sex practices

Bacterial Vaginosis	Overgrowth of problematic bacteria	Vaginal douching, new or multiple sexual partners	Thin, milky discharge, fishy odor	Antibiotics	Increased risk of other STIs, preterm labor, pelvic inflammatory disease	Limiting douching, treating pregnant women with symptoms, safe sex practices
Trichomoniasis	Parasite: Trichomonas vaginalis	Sexual contact	Painful urination, vaginal discharge, genital soreness, itching	Antibiotics	Preterm labor, low birth weight, neonatal complications	Treating all sexual partners simultaneously, retesting after treatment
Viral Hepatitis	Viruses: Hepatitis A, B, C	Sexual contact, shared needles, pregnancy and childbirth	Abdominal pain, nausea, vomiting	Vaccination, antiviral medications	Liver scarring, cancer, liver failure	Vaccination, safe sex practices, needle hygiene, prenatal screening and treatment
Zika	Virus: Zika	Mosquito bites, sexual contact	Mild symptoms, birth defects in fetus, Guillain-Barré Syndrome	Supportive care	Microcephaly, birth defects, nervous system issues	Avoiding travel to affected areas, mosquito bite prevention measures, safe sex practices

Source: the authors.

SDTs Induced infertility in females

1. Chlamydia

Chlamydia trachomatis is a Prep Gram-negative bacterium, can lead to reproductive damage in women, potentially causing pelvic inflammatory disease (PID), ectopic pregnancy, chronic pelvic pain, and tubal infertility if left untreated (Kasap., 2023). The infection is often asymptomatic in women but can result in severe consequences. Neglected chlamydia infection can trigger pelvic inflammatory disease (PID), inducing scarring and harm to the fallopian tubes. This scarring obstructs or damages the tubes, hindering the egg's journey from the ovary to the uterus, thus causing infertility (Butola., 2021). Diagnosis typically involves nucleic acid amplification tests (NAATs) conducted on swab samples (Zhou., 2021). According to Lau., 2021 and E. McDonald 2022, timely treatment with antibiotics like doxycycline is crucial to prevent long-term complications. Currently, multidose doxycycline is the recommended first-line treatment for uncomplicated chlamydia infections. Single-dose azithromycin is also advised for pregnant women (Van Gerwen et al., 2022).

2. Gonorrhea

Gonorrhea Neisseria gonorrhoeae, a Gram-negative bacterium, can induce mucosal infections in the urogenital tract (Bradford., 2020). Left untreated, it can lead to severe complications such as pelvic inflammatory disease (PID), tubal infertility, ectopic pregnancy, and disseminated gonococcal infection. Gonorrhea can trigger pelvic inflammatory disease (PID), resulting in scarring and damage to the fallopian tubes, potentially leading to infertility by blocking the passage of eggs from the ovaries to the uterus. It is diagnosed through nucleic acid amplification tests (NAATs) or culture from swab samples. Prompt treatment with antibiotics like ceftriaxone is crucial to prevent complications. Bradford., 2020 suggested that Ceftriaxone is the recommended first-line treatment for gonorrhea. Resistance to multiple antimicrobials is a concern, necessitating surveillance and development of alternative treatments like zoliflodacin and Gepotidacin (Smolarczyk., 2021). Currently, no licensed vaccines are available for chlamydia or gonorrhea but in 2017, evidence suggested that meningitis B vaccine might be beneficial for patients these patients with gonorrhea. However, the development of vaccines is urgently needed to prevent acquisition and reduce the burden of these infections, especially considering the rise of antimicrobial resistance (Haese., 2021) (Van Gerwen et al., 2022).

3. Genital Herpes HSV

Genital herpes, caused by HSV-1 or HSV-2, can lead to chronic and lifelong infections, with symptoms ranging from painful genital sores to asymptomatic periods (Cole., 2020). Farsimadan., 2021 suggested that HSV-2 is primarily associated with genital herpes infections globally. HSV-2 infection in women is associated with a threefold increased risk of HIV acquisition, which can indirectly lead to infertility due to HIV's impact on overall health and immune function (Duroseau., 2020). Diagnosis is challenging due to the resolution of characteristic lesions before patients seek care. Physical examination can make a presumptive diagnosis, but confirmation is through type-specific nucleic acid amplification testing (NAAT) or culture. Oral antivirals like valacyclovir are commonly used to manage HSV infections, including suppressive therapy to reduce symptoms and viral shedding. However, antivirals do not prevent recurrence, and lifelong adherence can be challenging. HSV infection during pregnancy can lead to neonatal herpes, a severe condition with high mortality rates and long-term neurological sequelae in survivors. Prevention includes elective Caesarean-section delivery in mothers with active herpetic lesions. Despite extensive research, no HSV vaccine has been successful in clinical trials. Initial trials focused on subunit vaccines targeting glycoprotein D (gD), but efficacy varied, particularly between genders. Current research explores

nucleic acid-based and live-attenuated vaccine platforms, aiming to understand mucosal immunity for vaccine development (Van Gerwen et al., 2022).

4. HIV Virus

HIV (Human Immunodeficiency Virus) this the virus type which targeted immune system. In this type, it weakens human body to fight against infections. Untreated HIV can progress to AIDS (Acquired Immunodeficiency Syndrome), which severely weakens the immune system. This progression can indirectly lead to infertility in several ways (Goulart., 2020). People with compromised immunity, such as HIV and AIDS patients, are vulnerable to unrelated infections like PID or genital tuberculosis that can negatively impact reproductive systems. HIV/AIDS affects the mortality rate to cancers including cervical and testicular further adding on the losses through fertility. Chemotherapy or radiotherapy can damage reproductive health, and some preferred ART can also have an unwanted effect on sperm count or ovarian reserve. A diagnosis of HIV requires screenings for antibodies, RNA measurement and CD4 cell levels. NRTIs belong to the non-nucleoside reverse transcriptase inhibitors ART, which suppresses the virus within the body such as HIV virus and it is used to treat AIDs. These fertility treatments in HIV-positive patients include IVF, ICSI, sperm washing, and PrEP for the partner (Gilling., 2023) (Carvalho., 2021). Surrogacy has been established as another form of assisted conception. To this effect, this paper seeks to explore the possibilities of HIV/AIDS affected individuals to conceive without transferring the disease on to the offsprings (Van Gerwen et al., 2022).

5. HPV

Human Papillomavirus (HPV) infects skin and mucous membranes, there are about 200 HPV types can be the reason of cancers and other health issues particularly high-risk strains (Kombe., 2021). HPV is the most common sexually transmitted infection worldwide and has high prevalence rate among most sexually active individuals contracting it at some point in their lives. According to statics, HPV prevalence is high among women in low- and middle-income countries, peaking before the age of 25 (Drolet., 2021). Though many women clear the infection naturally, persistent HPV can cause severe health problems, including cervical cancer—a leading cause of death among women globally. In 2012, HPV-related cervical cancer was responsible for 266,000 deaths, accounting for 8% of all female cancer deaths that year. Cervical cancer also brings significant health burdens, including infertility and incontinence due to radiation treatments (Van Gerwen et al., 2022).

Perez-Gonzalez and his team in 2022 demonstrated persistent high-risk HPV infections are implicated in nearly all cases of cervical squamous cell cancer. Akbari et al 2023 stated co-infections with other sexually transmitted infections (STIs), such as HIV, can increase the risk of HPV progressing to cancer. Women with HIV, especially those not adhering to antiretroviral therapy, are more likely to acquire high-risk HPV and develop pre-malignant or malignant lesions. Interestingly, persistent HPV infection also heightens the risk of acquiring HIV, although the exact mechanism is unclear. Co-infection with Chlamydia trachomatis can exacerbate the progression of cervical cancer through chronic inflammation, Liu., 2022 confirmed.

The development of HPV vaccines represents a significant medical achievement. Sympien et al., 2022 stated that universal HPV vaccination could prevent 70-90% of HPV-related diseases, including genital warts and cancers. The World Health Organization (WHO) aims to vaccinate 90% of girls by age 15 and screen and treat older women to eliminate cervical cancer by the next century (Bruni., 2021). Four HPV vaccines are currently available: Gardasil, Cervarix, Gardasil 9, and Cecolin (Lin., 2023). Tripathi et al., 2022 stated that these vaccines protect against HPV types 16 and 18, which cause most cervical cancers. Gardasil 9 also targets additional cancer-causing HPV types (31, 33, 45, 52, 58) which are responsible for 15% cervical cancers and other 11% of cancers which are caused by HPV and types 6 and 11, which cause most genital warts in 90% of cases and are rarely associated with genital track cancers.

HPV vaccination programs reduce the incidence of pre-malignant and malignant cancers; for instance, in England, routine HPV vaccination for girls aged 12-13 that was started in 2008 caused an 87% reduction in cervical cancer rates while a 97% reduction in high-grade cervical intraepithelial neoplasia. Other countries like Denmark and Sweden also followed HPV vaccination programs and showed a significant decrease in cancer-induced infertility due to HPV. HPV-related anal cancer is also a considerable concern, especially for women with HIV. In the U.S., HPV is shown to be the cause of 80% of anal cancer cases. Women with HIV face higher anal cancer risks, and routine screening is limited in most countries, but evidence suggests that we can reduce cancer incidence by treating precancerous lesions. Improved molecular assays and comprehensive follow-up are vital for accurate screening and management. HPV vaccination and effective screening remain crucial for prevention. Three HPV vaccines have been licensed by the U.S. Food and Drug Administration (FDA): the bivalent HPV vaccine (Cervarix, 2vHPV), the quadrivalent HPV vaccine (Gardasil, 4vHPV), and the 9-valent HPV vaccine (Gardasil 9, 9vHPV). All these vaccines protect against HPV types 16 and 18, which cause most HPV-related cancers, according to the CDC. Later, in 2016, Gardasil-9 (9vHPV) was approved and started using for "6, 11, 16, 18, 31, 33, 45, 52, and 58" HPV types.

6. Syphilis

Syphilis is caused by the spirochete Treponema pallidum subspecies pallidum, which is an STI type that is seen in various cases. Primary syphilis establishes as painless sores or chancres on the anogenital or oral areas. If, it is uncontrolled, it will progress to secondary syphilis, which causes diffuse rash and then further develops into severe complications like aseptic meningitis and pan uveitis. Syphilis has become a growing concern for women in the past few years, as in the U.S., primary and secondary syphilis rates have doubled from 2014 to 2018. Its rate remains more common among men who have sex with men (MSM); cases in heterosexual women surged by nearly 180% from 2015 to 2019, showing epidemic concern about syphilis through heterosexual transmission. This is especially worrying for women of childbearing age, leading to a significant increase in congenital syphilis. The rate of congenital syphilis cases jumped from 9.2 per 100,000 live births in 2013 to 57.3 per 100,000 in 2020; this rise has led to more stillbirths and infant deaths related to syphilis.

During pregnancy, syphilis ranked 2nd cause of stillbirth globally, leading to low birth weight, neonatal infections, and preterm delivery. Congenital syphilis is preventable with early detection and timely treatment of the maternal infection, but women in low- and middle-income countries lack access to adequate prenatal care and syphilis testing, hindering effective prevention.

The CDC and WHO recommend routine serologic screening for syphilis in pregnant women at their initial prenatal visit, at 28 weeks of gestation, and at delivery in high-prevalence areas. Despite these guidelines, there are geographical variations in the recommendations, which can affect the effectiveness of screening programs. Untreated syphilis during pregnancy has severe consequences for both the mother and the baby. Fortunately, syphilis is treatable with penicillin G, which remains highly effective as antimicrobial resistance is nearly non-existent. Treatment regimens for syphilis vary depending on the infection stage and site, but generally, penicillin G is administered through different doses and routes. For non-pregnant women with a true penicillin allergy, doxycycline can be used to treat primary, secondary, or latent syphilis. However, penicillin G is the only drug proven to prevent congenital syphilis, making it crucial for pregnant women (Van Gerwen et al., 2022). Treating pregnant women with a penicillin allergy poses challenges. In such cases, desensitization protocols may be necessary to safely administer penicillin. The optimal dosing regimen for penicillin G during pregnancy is still under study, but evidence suggests that an additional dose of benzathine penicillin G after the initial treatment may reduce the risk of congenital syphilis.

7. Bacterial Vaginosis

Bacterial Vaginosis (BV) is a condition of vagina when there is imbalance in normal bacterial flora. Beneficial bacteria of vagina like Lactobacillus decrease and harmful bacteria like Gardnerella vaginalis increase, symptoms may include unusual vaginal discharge with a fishy odor, itching, and irritation. Some women may not notice any of these symptoms and did not notice they have developed BV. Bacterial Vaginosis negatively impact female reproductive system and overgrowth of harmful bacteria can lead to pelvic inflammatory disease (PID) which damage fallopian tubes and reproductive organs and potentially cause infertility. This imbalance hampers sperm survival and raises the risk of STIs like chlamydia and gonorrhea, further harming reproductive health. Van Gerwen et al., 2022 digested diagnosing BV involves a pelvic exam, microscopic analysis of vaginal discharge, pH testing, and the whiff test to detect a fishy odor and treatment include antibiotics like metronidazole or clindamycin, taken orally or applied topically to restore vaginal bacterial balance. Preventing strategies for BV includes good genital hygiene, avoiding douching, safe sex, and probiotics use to support vaginal flora.

8. Trichomoniasis

Trichomoniasis, caused by the parasite Trichomonas vaginalis, poses significant health risks, especially for women. It causes vaginal discharge and painful urination, and can lead to preterm birth, low birth weight, and increases the risk of HIV, PID, and cervical cancer. Despite being common, it is often overlooked and underreported, exacerbating racial and geographic disparities. Advanced diagnostic methods, like NAAT tests, detect T. vaginalis with high accuracy. Treatment usually involves 5-nitroimidazoles like metronidazole or tinidazole, with multidose metronidazole preferred for women. The FDA's recent approval of single-dose secnidazole offers a promising new option, potentially improving treatment accessibility and effectiveness. Addressing this STI is crucial for public health (Van Gerwen et al., 2022)

9. Hepatitis A B & C

Prevalence results shows that hepatitis A, B, and C are serious global health threats, each affecting individual differently. Research by Van Gerwen et al., 2022 stated that hepatitis A spreads through contaminated food or water, causing acute liver inflammation with symptoms like jaundice and fatigue. Hepatitis B and C spread through blood, sexual contact, or

from mother to child, often leading to chronic infections that can cause cirrhosis and liver cancer if untreated. Diagnosis involves blood tests for viral antigens or antibodies. Hepatitis A usually resolves with supportive care, while Hepatitis B and C may need antivirals. Vaccines prevent Hepatitis A and B, and safe practices reduce Hepatitis B and C transmission. Public health efforts focus on awareness, testing, and treatment access and research advancements, like direct-acting antivirals for Hepatitis C, improve treatment outcomes.

10. Zika

The Zika virus is known to spread by Aedes mosquitoes which is dangerous because it poses serious health risks in pregnant women and their fertility. This virus can be transferred from one partner to another through sexual contacts regardless of the fact that the partners may not show symptoms of the disease and the virus may be more difficult to be eradicated from the semen than from other body fluids. Almeida et al. (2020) indicated that in males, it grows in mature sperms and makes them infected leading to infertility. It is capable of causing congenital Zika syndrome (CZS), which results to complications in new born babies such as low head circumference and neurological disorders. Zika is also believed to be a cause of other mild conditions such as birth defects including brain abnormalities and a form of paralysis known as Guillain-Barré syndrome. Zika is difficult to diagnose since its symptoms core the same as dengue, chikungunya and other diseases that are transmitted by the mosquito such as fever, rash, joint pain and red, itchy eyes. According to The Centers for Disease Control and Prevention, the RT-PCR test is more suitable for identifying Zika virus than the others, while serological tests are used to confirm the results. Prevention focuses on mosquito control: eliminating breeding sites, using repellents, and wearing protective clothing. Pregnant women should avoid areas with active Zika outbreaks. Public health campaigns educate communities about prevention and risks. There's no specific antiviral treatment for Zika, but supportive care helps manage symptoms. Research on vaccines and antiviral therapies is ongoing. Until then, vigilant mosquito control and public health measures are essential to mitigate Zika's impact (World Health Organization: WHO, 2022).

11. STIs induced male infertility

Diseases such as Chlamydia, gonorrhea, syphilis, human papillomavirus (HPV), and genital herpes, which are considered as sexually transmitted diseases impact fertility among men. Chlamydia left untreated can cause epididymitis, which in turn leads to epididymal inflammation and, sometimes, testicular pain in addition to making a man unable to father a child. Similarly untreated gonorrhea can cause epididymitis and urethritis that may have negative effects on the quality of semen as well as the process of ejaculation. Both the infections are consequential to reproductive tract scarring and can hinder sperm passage to cause infertility. Concerning diagnosis, there is semen analysis that aims at determining sperm count, their movement and shape, which is so vital in diagnosing reproductive issues in men. Furthermore, scrotal ultrasound is suggested in cases of inflammation, submutual cysts, masses, and other apparent obstructions to be clearly visualized in scrotal and surrounding areas. Managing the condition often requires use of antibiotics for controlling the reproduction of fungi as well as inflammation.

CONCLUSION

Navigating fertility with STD risks needs careful attention and proactive steps such as use of condoms, antibiotics, antivirals or antifungals. If untreated, STIs infections like chlamydia and gonorrhea can lead to pelvic inflammatory disease, harming fallopian tubes and reducing fertility. HPV, a common virus, can cause cervical changes that make conception harder. Men aren't spared either; STDs can lead to epididymitis and lower semen quality. Prevention, early detection, and quick treatment are key to protecting fertility. Taking preventive measures against STDs is key to protecting fertility. Practice safe sex, get regular screenings, and seek prompt treatment if needed. At Gravida, we're here to guide you with compassion and expertise, ensuring you can focus on your journey to parenthood with confidence and peace of mind (Almeida., 2020).

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